

STAR 2006: NOAA Ship *McArthur II* Weekly Science Report

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Science Summary: 7 - 13 September 2006

At the time of this writing, we are 3500 km from the Galapagos Islands and 4000 km from the Hawaiian Archipelago; truly remote from land, but not from life. Most of our week has been spent in “Large Current #2” of the leg, the Equatorial Countercurrent, a gigantic river of water spanning hundreds of km from north to south which runs from the western Pacific to the American continents. It is fresher and warmer than waters to the north and south of it, and the animals out here pay attention to these differences for reasons that are not entirely understood.

Although we expect relatively high winds way out here in the middle of the Pacific (the trade winds are never very far away), weather gifts do come our way and last Thursday we received such a gift. Absolutely spectacular would be an understatement; not a whitecap to be seen, from sunup to sundown and in the afternoon, we ran into the mother-lode of animals. Sighting after sighting came fast and furious so that it was impossible for any self-respecting biologist to leave the flying bridge (unless you were an acoustician, and then you were glued to your earphones). We all got sunburns and ate dinner late (“These are the days we observers live for” – JM Cotton.) This was a very different assemblage from the spotted and spinner dolphins just days before (in “Large Current #1” of the leg). Instead, we had a steady diet of striped dolphins followed by “blackfish extravaganza” – seemingly endless pockets of pilot whales, one of these mixed with rough-toothed dolphins and our first Melon-headed whales of the trip. But the Coup de Gras was a school of Fraser’s Dolphin – our first, and likely last, of this year’s cruise. Described as a species in 1956 from a single skull, it was not recognized in the wild until 1971. This dolphin is characteristically seen out here near the equator and we have come to look for and expect them there.

With the good must come the dues and we paid those this week as well, both in terms of a zero-sighting day, despite the perfectly acceptable Beaufort 4 conditions, and the zero-sighting day due to the unworkable Beaufort 6+ conditions. Birders, of course, work on through it all and were treated to huge densities and record-breaking diversity that the countercurrent often brings, again, for unexplained reasons.

Our course has been more east than south but we have been slowly and steadily southing toward the magical zero line. The crossing of the equator brings an ancient ritual of preparing sailors that have not been to southern latitudes before for the entrance into King Neptune’s Realm. The *McArthur II* carried thirteen of these naïve souls and the rites of passage were strictly followed (the XO deserves special mention for his outstanding courage, and Phil for his amazing talent). Today, we have thirteen brand new Shellbacks among us, their shells just starting to harden (and 10 sporting new-age hair styles).

Sightings and Effort Summary for Marine Mammals

Date	Start/ Stop Time	Position	Total nm	Average Beaufort
090706	0642	N08:09.87 W146:08.52	67.7	2.3
	1837	N07:39.12 W144:29.29		
090806	0634	N07:01.02 W142:48.63	123.5	4.0
	1816	N06:20.65 W140:49.95		
090906	0616	N05:52.09 W139:27.36	54.0	5.0
	1658	N05:22.76 W137:47.30		
091006	0602	N04:56.06 W136:14.66	78.9	4.0
	1759	N04:32.34 W134:52.10		
091106	0645	N04:06.72 W133:23.12	106.1	4.3
	1834	N03:32.86 W131:25.32		
091206*	---			6 +

091306	0621	N02:21.88 W127:18.35	102.5	4.7
	1821	N01:51.95 W125:35.44		

*No mammal effort due to weather

Code	Species	Number of Sightings
013	<i>Stenella coeruleoalba</i>	5
015	<i>Steno bredanensis</i>	1
026	<i>Lagenodelphis hosei</i>	1
031	<i>Peponocephala electra</i>	1
033	<i>Pseudorca crassidens</i>	2
036	<i>Globicephala macrorhynchus</i>	4
037	<i>Orcinus orca</i>	1
049	Ziphiid Whale	1
051	<i>Mesoplodon</i> sp.	2
061	<i>Ziphius cavirostris</i>	1
070	<i>Balaenoptera</i> sp.	1
072	<i>Balaenoptera edeni</i>	2
079	Unid. large whale	1
Total		23

Biopsies (Suzanne Yin and Erin LaBrecque)

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
<i>Delphinus delphis</i>	Short-beaked common dolphin	-	-	2	3
<i>Stenella attenuata</i>	Pantropical spotted dolphin	-	-	1	1
<i>Tursiops truncatus</i>	Bottlenose dolphin	-	-	6	9
Total		0	0	9	13

Photo Project (Isabel Beasley and Jim Cotton)

A very busy week for photography on the *McArthur II*, however, most of our photographs were of the lowly Pollywogs as they went about their important business of getting initiated into King Neptune's Realm – receiving their charges, a beauty pageant with some sights we would rather have not captured on film, an extremely entertaining talent show and crossing ceremony.

As for the cetaceans, it has been another comparatively good week. A major highlight was a Bryde's whale that surfaced only 200m away from the ship, leaving us with some great lateral shots of the entire body. We also obtained excellent photographs of two false killer whales, as they inquisitively approached and surfaced alongside the ship.

Species	Weekly Photographs		Total	
	Individuals	Schools	Individuals	Schools
<i>Stenella attenuata</i> (offshore)				1
<i>Stenella longirostris</i> (whitebelly)				6
<i>Stenella coeruleoalba</i>				2
<i>Delphinus delphis</i>				5
<i>Tursiops truncatus</i>				3
<i>Lagenodelphis hosei</i>		1		1
<i>Pseudorca crassidens</i>	2	2	2	2
<i>Globicephala macrorhynchus</i>		3	2	5
<i>Orcinus orca</i>			5	1
<i>Physeter macrocephalus</i>				1
<i>Balaenoptera edeni</i>	1	1	1	2
<i>Balaenoptera musculus</i>			1	1
<i>Stenella longirostris</i> (southwestern)		1		1
Total	3	8	11	31

Seabird and Marine Debris (Michael Force and Sophie Webb)

Logging 20 species a day can't go on forever, especially in an oceanic habitat as diverse as the tropical equatorial Pacific Ocean. Have we become spoiled by the plethora of avian riches that fluttered and flapped this week across our fortunate position atop the *McArthur II*? It was a remarkable week, thanks to our meanderings through the North Equatorial Countercurrent. Or rather, thanks to the meanderings of the North Equatorial Countercurrent. We hit the mother-lode on Friday — a record day total of 23 species! In fact, we reached the 20 species plateau twice, unequivocal proof of the amazing diversity of seabirds that utilize the NECC. However, these heady days may soon be a distant memory as we continue south into King Neptune's realm, clawing and scratching our way to six species on Wednesday. Besides Sooty Terns, the oceanic skies here are practically devoid of birds and we missed Juan Fernandez Petrel for the first time in six weeks; the day before, there were hundreds. It is indeed patchy out here. We found 28 species this week with a daily average being an impressive 18 species. This includes nine species of petrels, seven species of shearwaters and all three jaegers. We saw our first Phoenix Petrels of the cruise. This attractive *Pterodroma* was relatively common on a couple of days in the countercurrent. Sometimes it's good to be proven wrong, such as my prognostication last week that Peter (or is that Petra?), "our" Pacific Golden-Plover that has taken up residence on the foredeck, will expire. No way! Thanks to its primary care-giver, Sophie, who has a soft spot for lost *Pluvialis*, it appears to be doing quite well, now into its tenth day on board, enjoying daily

feedings of brine shrimp and the occasional chopped fish. This is the first week of the cruise where we didn't see any marine debris. That's right—none.

Fish sampled for diet and isotope analysis (for Bob Olson, IATTC)

	Samples	
Species	Weekly	Total
Wahoo		1

Oceanographic Operations (Melinda Kelley)

The week began with sea surface temperatures of 28-29 °C and surface salinity of 34.1 PSU. As oceanographic operations began early Tuesday morning, the effects of the South Equatorial Current were apparent. The sea surface temperatures dropped to 26.5 °C and surface salinity readings of 35.1 PSU were recorded. These effects were also visible on our Tuesday morning CTD profile. The features of the profile changed drastically in comparison to previous CTD casts. As we continue to move into the South Equatorial Current, we certainly will not be returning to 29 °C sea surface temperatures. With the help of our oceanographic team, XBT casts and net tow operations continue with great success.

Date	CTD	XBT	Bongo tow	Manta tow
7 Sept	1	4	1	1
8 Sept*	3	3	1	1
9 Sept	2	3	1	1
10 Sept	1	4	0	0
11 Sept	2	3	1	1
12 Sept	1	4	1	1
13 Sept	2	3	0	0
Total	12	20	5	5

*Salinity test cast conducted prior to evening CTD station.

Squeakly Report (Shannon Rankin and Liz Zele)

With enough years at sea, King Neptune occasionally entertains requests of his more Honorable Shellbacks. Pushing the limits of his hospitality, Shannon had the nerve to make an early morning request for a sighting of either Fraser's dolphins or melon-headed whales. Both are considered amongst the rarest cetaceans in our study area. Much to the surprise of the considerably slimy wogs, both requests were met, and both on the day requested. Now, if this cocky shellback can just remember to request that the animals actually vocalize!

It has been a very busy week for acoustics, with recordings from sperm whales, striped dolphins, false killer whales, pilot whales, and 42 dolphin encounters that were not sighted by the observers (most were outside of their range). Readers will note that no recordings were made of the Fraser's dolphins nor the melon-headed whales. We also deployed several successful sonobuoys on Bryde's whales doing their rather silly imitation of frogs in love (we were also privy to a performance of Ignacio imitating a Bryde's whale imitating frogs in love).

Dippers' Doldrums (Jim Cotton)

Flyingfish distribution remained patchy and species diversity relatively low this week as we continued our efforts along the track line hoping to reach the equator by week's end. Passing through latitude 3° N, tens of thousands of the two-winged variety of flyingfish were seen in a 12-hour period as "sheets" of these fish took to the air in mass off our bow, an impressive sight even for the saltiest of sailors.

Twenty three specimens representing five species of fliers were collected at our evening stations, not counting the short-winged flyingfish (not considered a real flyingfish, as it belongs to a different family). New to our collection this week, and for the cruise, is *Hirundichthys albimaculatus*, although the common name is whitespot flying fish, "Magenta-Winged" would be fitting. Also seen at the dipping stations in moderate numbers were lantern fish, squid (all *Sthenoteuthis*), a few small Mahi-Mahi and the omnipresent Halobates.

We're sad to report that one of our box fish sloshed out of the aquarium during a storm and now resides in Davy Jones' Locker. R.I.P.